On the Nature of Dictyophyton. By R. P. Whitfield.

Since writing the article on *Dictyophyton* published in the last number of this journal I have obtained additional evidence of their spongoid character. About the middle of May, while discussing their nature with Principal Dawson, of Montreal, we examined some allied forms from the Keokuk beds at Crawfordsville, Indiana, which lately came into the possession of the American Museum of Natural History, and found one which retained the substance of the organism. Under a hand-glass of moderate power it is seen to have been composed of cylindrical threads of various sizes, now replaced by pyrite. With the means then at our command it was impossible to fully determine whether they had been bundles of vegetable fibres or sponge-like spicules; but Dr. Dawson kindly offered to examine them more critically if I would forward a specimen to him at Montreal. This was done; and his note on their nature is appended below. The specimen used probably belongs to the genus *Uphantœnia*, Vanuxem, and is a fragment about $2\frac{1}{2}$ by 3 inches across, and seems to have been a part of a circular or discoid frond of 8 or 10 inches diameter. It differs from *Uphantœnia chemungensis* of New York in many features. The broad radiating bands are more distant, with a narrow thread-like band between; while all the circular bands have been narrow or thread-like. The spaces between the bands and threads are rectangular and covered by a thin film, which is alternately elevated or depressed in the adjoining spaces, as if the bands had been elastic, like rubber, and had contracted, wrinkling up the intermediate spaces. A further description and illustration of the form I shall defer to a future occasion, but shall here designate the species as *Uphantœnia Dawsoni*. The broad bands are composed of very fine thread-like spicules, and the narrow ones of much stronger ones, while the thin film occupying the intermediate spaces is composed of still smaller spicules, apparently arranged in a radiating manner. The character and nature of these threads and spicules are well set forth in Dr. Dawson's note below, and the spongoid features and relations to *Euplectella* indicated.—*Amer. Journ. Sci.*, Aug. 1881.

Note by Dr. J. W. Dawson *on the Structure of a Specimen of* Uphantænia *from the Collection of the American Museum of Natural History, New York City.*

To the naked eye the fossil presents rectangular meshes of dark matter on a grey, finely arenaceous matrix. The spaces of the network are of an average size of 6 millim. in length and 4 or 5 in breadth. The longitudinal bands are about 3 millim. broad, the transverse bands much narrower. Some of the rectangular interspaces are of the colour of the matrix, others wholly or partially

stained with dark matter. The meshes are nearly black, but in a bright light show a fibrous texture and metallic lustre, due to pyrite.

Viewed as opaque objects under the microscope, the reticulating bands are seen to be fascicles of slender cylindrical rods or spicules varying much in diameter, some of the largest being in the narrow transverse bands. The spicules may in a few cases be seen to be tapering very gently to a point, but usually seem quite cylindrical and smooth. In their present state they appear as solid shining rods of pyrite. The largest spicules are about $\frac{1}{500}$ of an inch in diameter, the smaller scarcely one fourth of that size. The spicules of the transverse bands cross those of the longitudinal ones without any organic connexion. Among the long spicules of the bands can be seen multitudes of very minute and apparently short spicules confusedly disposed; and these abound also in the dark-coloured areoles.

On the whole the structures are not identical with those of any plant known to me, and rather resemble those of siliceous sponges of the genus *Euplectella*.

The most puzzling fact in connexion with this view is the mineral condition of the spicules, now wholly replaced by pyrite. Carbonaceous structures are often replaced in this way; and so are also calcareous shells, especially when they contain much corneous matter; but such changes are not usual with siliceous organisms. If the spicules were originally siliceous, either they must have had large internal cavities which have been filled with pyrite, or the original material must have been wholly dissolved out and its place occupied with pyrite. It is to be observed, however, that in fossil sponges the siliceous matter has not unfrequently been dissolved out, and its space left vacant or filled with other matters. I have specimens of *Atylospongia* from the Niagara formation which have thus been replaced by matter of a ferruginous colour; and in a bundle of fibres, probably of a sponge allied to *Hyalonema*, from the Upper Llandeilo of Scotland, I find the substance of the spicules entirely gone, and the spaces formerly occupied by them empty. It should be added that joints of crinoid stems and fronds of *Fenestella* occurring in the same specimen with the *Uphantœnia* are apparently in their natural calcareous state.

Though I have hitherto regarded this curious organism as a fucoid, I confess that the study of the specimen above referred to inclines me to regard it as more probably a sponge.

I owe the opportunity of examining this very interesting specimen to the kindness of Professor Whitfield.—*Amer. Journ. Sci.*, Aug. 1881, p. 132.

Mortality of Fish in the Gulf of Mexico.

From notices appearing in the 'Proceedings of the United States' National Museum' it appears that for the last two years there has